



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ES 005-P/WO	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/CH2003/000828	International filing date (day/month/year) 17 December 2003 (17.12.2003)	Priority date (day/month/year) 17 December 2002 (17.12.2002)
International Patent Classification (IPC) or national classification and IPC A23P 1/12, B29C 47/04, 47/30		
Applicant BÜHLER AG		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 7 sheets.

3. This report contains indications relating to the following items:

- I Basis of the report
- II Priority
- III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV Lack of unity of invention
- V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI Certain documents cited
- VII Certain defects in the international application
- VIII Certain observations on the international application

Date of submission of the demand 16 April 2004 (16.04.2004)	Date of completion of this report 30 March 2005 (30.03.2005)
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

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International application No.

PCT/CH2003/000828

I. Basis of the report**1. With regard to the elements of the international application:*** the international application as originally filed the description:pages 4, 5, as originally filed

pages _____, filed with the demand

pages 1, 1a, 2, 2a, 3, filed with the letter of 06 January 2005 (06.01.2005) the claims:

pages _____, as originally filed

pages _____, as amended (together with any statement under Article 19

pages _____, filed with the demand

pages 1-7, filed with the letter of 06 January 2005 (06.01.2005) the drawings:pages 1/5-5/5, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

 the sequence listing part of the description:

pages _____, as originally filed

pages _____, filed with the demand

pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

 the language of a translation furnished for the purposes of international search (under Rule 23.1(b)). the language of publication of the international application (under Rule 48.3(b)). the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:** contained in the international application in written form. filed together with the international application in computer readable form. furnished subsequently to this Authority in written form. furnished subsequently to this Authority in computer readable form. The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished. The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.**4. The amendments have resulted in the cancellation of:** the description, pages _____ the claims, Nos. _____ the drawings, sheets/fig _____**5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).****

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1 - 7	YES
	Claims		NO
Inventive step (IS)	Claims	1 - 7	YES
	Claims		NO
Industrial applicability (IA)	Claims	1 - 7	YES
	Claims		NO

2. Citations and explanations

1. This report makes reference to the following documents:

D1: FR-A-2572898

D2: US-A-4835000

2. The following observations are made with regard to PCT Article 33(2).

- 2.1 Document D1 discloses a method for producing coloured feedstuffs or foodstuffs or the like by extrusion, with the admixture of colourants to a product and the extrusion or expansion of the product-colourant mixture, the product stream being subdivided into independent substreams depending on the number of different colourants, each colourant being mixed with only a substream, and the substreams being combined only shortly before they exit a processing device, in such a way that the finished product retains different coloured zones, as defined in the preamble of claim 1; cf. page 5, lines 10-24, and figures 2 and 3.

The subject matter of claim 1 therefore differs from

the prior art known from D1 in that the substreams of different colours exit the device through a nozzle arrangement having ducts with flow-regulating elements that modify the stream cross-section, and in that the premixed coloured product streams are combined only when they pass through the outlet nozzle.

The subject matter of claim 1 is therefore novel (PCT Article 33(2)).

The objective problem addressed by claim 1 is that of creating a clearly defined colour differentiation in extruded products having two or more colours and a great diversity of shapes and coloured designs; cf. page 1a, lines 4-7.

The solution proposed in claim 1 of the present application appears to involve an inventive step because the prior art does not contain any hints of the use of ducts having flow-regulating elements that modify the stream cross-section in order to solve the objective problem addressed by claim 1.

Claim 1 therefore meets the requirement of PCT Article 33(3).

- 2.2 Document D1 discloses a device for producing coloured feedstuffs or foodstuffs or technical products using an extruder or expander having a nozzle plate with a plurality of nozzles (13, 14) through which a coloured product is output, a mixing section (II) being arranged downstream of the extruder, in the product flow direction. The mixing section (II) comprises for each colourant a mixing

screw (34, 44) arranged in a mixing chamber (5), as well as a downstream nozzle arrangement which contains ducts that lead from the mixing chambers (5) to nozzles (13, 14) in a nozzle plate (6), as defined in the preamble of claim 6; cf. page 5, lines 10-24, and figures 2 and 3.

The subject matter of claim 6 therefore differs from the prior art known from D1 in that the ducts comprise flow-regulating elements that modify the stream cross-section, and in that the ducts from the various independent mixing chambers are combined only shortly before the nozzle plate.

The subject matter of claim 6 is therefore novel (PCT Article 33(2)).

The objective problem addressed by claim 1 is that of creating a clearly defined colour differentiation in extruded products having two or more colours and a great diversity of shapes and coloured designs; cf. page 1a, lines 4-7.

The solution to this problem, as proposed in claim 6 of the present application, appears to involve an inventive step because the prior art does not contain any hints of ducts having flow-regulating elements that modify the stream cross-section and permit the production of a great diversity of product shapes and coloured designs.

Claim 6 therefore meets the requirement of PCT Article 33(3).

3. Claims 2-5 are dependent on claim 1 and therefore

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likewise meet the PCT novelty and inventive step requirements.

Claim 7 is dependent on claim 6 and therefore likewise meets the PCT novelty and inventive step requirements.

4. Claims 1-7 meet the requirement of PCT Article 33(4).

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A method for producing colored pet food
or foodstuffs and an apparatus for this purpose

The invention relates to a method for producing colored pet food or foodstuffs, especially of two-colored pet food or foodstuffs or also pharmaceutical or other technical articles according to the preamble of the claim. The invention further relates to an apparatus for producing colored pet food or foodstuffs and technical applications.

A method in an apparatus for producing colored pellets are known from DE-A-19754863. A first granulator is provided for shaping molten resin of one color into pellets and a second granulator for shaping molten resin of another color into pellets. Whereas the first granulator produces a connection to a delivery opening, the second granulator is blocked, so that the cleaning can occur within a short period when the color is changed. The pellets only contain the color of the resin of the first or the second granulator.

The production of colored pet food by extrusion is also known. However, it was not yet possible to achieve clear separations between the individual color regions.

Although FR-A-2572898 describes a method and an apparatus for producing foodstuffs which have differently treated regions (e.g. differently colored or aromatized regions), the apparatus described here does not offer any possibility for various product shapes or color designs of the product.

US-A-4835000 describes the use of automatically controlled valves in the feed conduits to a nozzle configuration comprising several tubes. As a result, the possibilities for acting on the color design or the pattern design of the product are limited.

The invention is therefore based on the object of providing a method for developing colored pet food or foodstuffs and the like which allows a clearly delimited distribution of colors in extruded products with two or more colors and with numerous product shapes and color designs. This object is achieved with the features of claim 1.

The pet food or foodstuffs are prepared at first in the required manner in an extruder for example. Thereafter, the desired food colorings are added individually to the prepared

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product in a short mixing region, mixed with the same and thereafter shaped or expanded through nozzles. Elements changing the cross section and regulating the flow are contained in the conduits leading to the nozzles.

Only after passing the nozzle, the individual premixed product food coloring streams are joined together without allowing any further mixing or intermingling.

Such color delimitations in accordance with the invention can be produced in pellets or extruded/expanded products of a large variety of shapes. Special additives such as vitamins or pharmaceuticals can be concentrated in specific regions of a product. This on the other hand allows for an improved assortment and provision of such products. Optionally, the intake of pet food or foodstuffs can be stimulated in a purposeful manner through colors or colored patterns, as also purposeful recognition of a product.

The invention further relates to an apparatus for producing colored pet food or foodstuffs or the like. This object is achieved with the features of claim 6.

In accordance with the invention, a multi-shaft mixing region follows the region of the preparation of the product. The individual shafts are separated from one another in a spatial respect, with each shaft region corresponding to a color or an additive. The shafts are used to merely mix the basic materials and the food coloring or additives. Any influence on the product properties is not made at all or only very minimally. Elements changing the cross section and regulating the flow are contained in the conduits leading to the nozzles. The mixing products of the individual regions are joined together only in the region of a delivery nozzle.

Preferred embodiments are disclosed in the subclaims. Preferably, a two-shaft mixing region in conjunction with the nozzle plate is used.

The invention is explained below in closer detail by reference to an embodiment shown in the drawings, wherein:

Fig. 1 shows an apparatus for producing colored pet food or foodstuffs in a schematic view;

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Fig. 2 shows a bicolor arrangement;

Fig. 3 shows an example for products to be produced;

Fig. 4 shows further arrangement variants a through e.

A double-shaft extruder 1 with mixing and kneading screws 2 is provided with an additional mixing section 3 with two independent mixing chambers 4 for a mixing screw 5 in the direction of the product flow. The mixing screws 5 have a lower diameter as compared with the mixing and kneading screws 2 and are used exclusively for mixing in a food coloring into the prepared product. The food coloring reaches a mixing region via a feed conduit 6, 6', so that different colors cannot be mixed with each other.

The mixing section 3 is sealed in the example by an end plate 7. The end plate 7 is followed by a bicolor nozzle 8. The nozzle 8 consists of four plates (there can also be less) which allow a regulation of the two colored product flows 10, 10'. The product flows 10, 10' are joined before each individual nozzle 12 only before the nozzle plate 11. In the case of veined products, the joining of the partial flows could also occur at an earlier time. The joined product flows 10, 10' are cut in the conventional manner upon emerging from the nozzles 12 and expand into end products 13 with clearly separated color regions. Expanding is not mandatory.

The intermediate plates of the bicolor nozzle 8 comprises conduits with slides and other elements changing the cross section for flow regulation and can be twisted relative to each other in order to enable the realization of various product shapes and color designs.

The mixing section 3 can comprise further openings for the admixture of further additives.

The mixing section 3 is provided in the example with a relatively short configuration and a merely veined product can be obtained by reduction of the mixing intensity and/or the length of the mixing screws 5.

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It is also possible by changing the configuration of the bicolor nozzle 8 to produce traditionally expanded (Fig. 4b, c) or veined (Fig. 4d) products, as also extruded materials with different mixed colors (Fig. 4a).

CLAIMS:

1. A method for producing colored pet food or foodstuffs or the like by means of extrusion by adding food colorings to a product and by extruding/expanding the mixture of product and food coloring, with the product stream being divided into mutually independent partial streams depending on the number of different food colorings, and a food coloring is mixed with only one partial stream, and that the partial streams are joined together only shortly before the delivery from a treatment device in such a way that the different color regions are maintained in the end product (13), characterized in that the delivery of the differently colored partial streams occurs by way of a nozzle arrangement and that the premixed product color streams are joined only when passing the delivery nozzle.
2. A method according to claim 1, characterized in that two food colorings are added.
3. A method according to claim 1 or 2, characterized in that further additives are added to at least one partial stream.
4. A method according to at least one of the claims 1 to 3, characterized in that each food coloring is mixed with the partial stream by means of a separate mixing screw (5).
5. A method according to claim 1, characterized in that the partial streams are joined only shortly before expanding.
6. An apparatus for producing colored pet food or foodstuffs or technical products with an extruder/expander, comprising a nozzle plate with several nozzles (12) for the delivery of a colored product, with the extruder being provided downstream in the direction of product flow with a mixing section (3) which comprises a mixing screw (5) each in a mixing chamber (4) per food coloring with a downstream nozzle arrangement, and the nozzle arrangement comprises conduits which lead from the mixing chambers (4) to nozzles (12) of a nozzle plate (11), characterized in that the conduits comprise elements changing the

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cross section and regulating the flow, and that the conduits of the different, mutually independent mixing chambers (4) are joined only before the nozzle plate (11).

7. An apparatus according to claim 5 or 6, characterized in that the mixing section (3) comprises two mixing chambers (4).

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International preliminary

examination report - Supplement

5/8/05

With reference to item V

Established findings according to Rule 66.2 (a) (ii) concerning the novelty, inventive step and commercial applicability; documents and explanations in support of these findings.

1. Reference is hereby made to the following documents:

D1: FR-A-2572898

D2: US-A-4835000

2. The following is remarked concerning the requirements of Article 33(2) PCT.

2.1 Document D1 discloses a method for producing colored pet food or foodstuffs or the like by means of extrusion by adding food coloring to a product and extruding/expanding the mixture of the product with the food coloring, with the product stream being divided into mutually independent partial streams depending on the number of different food colorings, and a food coloring is mixed with only one partial stream, and that the partial streams are joined together only shortly before the exit from a treatment device in such a way that the different color regions are maintained in the end product, according to the preamble of claim 1 (cf. page 5, lines 10 to 24, and figs. 2 and 3).

The subject matter of claim 1 therefore differs from the state of the art as known from D1 in such a way that the exit of the differently colored partial streams occurs through an arrangement of nozzles which comprises conduits with elements changing the cross section and regulating the flow, and that the pre-mixed product color streams are only joined after passing the outlet nozzle.

The subject matter of claim 1 is therefore new (Article 33 (2) PCT).

The object underlying claim 1 is the creation of a clearly delimited distribution of color in extruded products of two or more colors with a large variety of product

shapes and color designs (cf. page 1a, lines 4 to 7).

The solution as proposed in claim 1 of the present application seems to be based on inventive step because the state of the art does not provide any information as to the application of conduits with elements changing the cross section and regulating the flow in order to achieve the object underlying claim 1.

As a result, claim 1 meets the criterion as demanded by Article 33 (3) PCT.

2.2 Document D1 discloses an apparatus for producing colored pet food or foodstuffs or technical products with an extruder/expander which comprises a nozzle plate with several nozzles (13, 14) for the delivery of a colored product, with the extruder being provided downstream in the direction of flow of the product with a mixing section (II) which each comprises one mixing worm (34, 44) in a mixing chamber (5) per food coloring with a downstream nozzle arrangement, and the nozzle arrangement comprises conduits which lead from the mixing chambers (5) to the nozzles (13, 14) of a nozzle plate (6) (according to the preamble of claim 6; cf. page 5, lines 10 to 24, and figures 2 and 3).

The subject matter of claim 6 therefore differs from the state of the art as known from D1 in such a way that the conduits comprise elements changing the cross section and regulating the flow, and that the conduits of the different, mutually independent mixing chambers are joined only before the nozzle plate.

The subject matter of claim 6 is therefore new (Article 33 (2) PCT).

The object underlying claim 1 is therefore the creation of a clearly delimited distribution of color in extruded products of two or more colors with a large variety of product shapes and color designs (cf. page 1a, lines 4 to 7).

The solution as proposed in claim 6 of the present application for this object seems to be based on inventive step because the state of the art does not provide any information about conduits with elements which change the cross section and regulate the flow and which thus allow a large variety of product shapes and color designs.

Claim 6 thus fulfills the criterion as demanded by Article 33 (3) PCT.

3. Claims 2 to 5 are dependent upon claim 1 and thus also fulfill the requirements of PCT with respect to novelty and inventive step.

Claim 7 depends on claim 6 and thus also fulfills the requirements of PCT concerning novelty and inventive step.

4. Claims 1 to 7 fulfill the criterion of Article 33 (4) PCT.